DOCUMENT RESUME

ED 025 460 SP 001 931

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Simulation Applications in Teacher Education.

Pub Date 66

Note- 11p.; Presented at the Am. Educational Research Assn., Chicago, Feb., '66. An adaptation appeared in The School Review; v75 n2 p197-204 Summer '66.

EDRS Price MF-$0.25 HC-$0.65

Descriptors- Class Management, Classroom Environment, College Students, Decision Making Skills, *Educational Research, Education Courses, Facilities, Feedback, Films, Instructional Materials, Response Mode, Simulated Environment, *Simulation, *Teacher Education, *Teacher Experience, Teacher Response, Teaching Procedures, *Training Techniques, Transfer of Training

Identifiers- Oregon State System of Higher Education, Teaching Research Division

In 1961, Teaching Research Division of Oregon State System of Higher Education began developing a variety of simulated classroom situations through the medium of sound motion pictures and printed materials. It has been testing this technique which permits a supervising teacher to control the stimulus events in the classroom via simulated experience, forcing a teacher trainee to focus on a situation and devise different modes of responding. Instructional simulation offers the trainee an opportunity to build his own strategies of searching for cues that signal a decision-making process on his part, to test hypotheses he has about how to respond to these problems, and to change his behavior in view of the feedback he receives. Findings from the first four years of research suggest that realism and prompting are not important variables in enhancing transfer of training in comparison with instructor differences and possibly length of training. Initial evidence indicates that there is transfer of learning from simulated to real experience, but much remains to be learned about how simulation best works. A project is under way to produce low-cost simulation packages (original materials required expensive laboratory facilities and equipment) that may be adapted for self-instructional or group use as well as for the tutorial method now used. (Appended is a description of the materials so far developed, the instructional procedures employed in using time, and the facilities required.) (JS)

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Simulation Applications in Teacher Education[1]

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The purpose of this paper is to discuss the application of the classroom simulation technique to problems of teacher preparation. A resume of the history leading to the development of classroom simulation will be given, and the advantages of the technique will be discussed. Finally, general findings of recent research will be evaluated in light of future developments in the area.

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What is Classroom Simulation?

In Oregon, simulation as an instructional medium in teacher education has been under development since 1961. In that year, Bert Kersh, armed with NDEA Title VII support, built a simulation facility and initiated the development of a variety of simulated classroom situations. These situations were simulated through the medium of sound motion pictures and printed materials.[2] The original theoretical basis for the technique was based on the operant conditioning model. It was assumed that the behavior that student teachers exhibit in practice teaching is controlled primarily by external stimuli in the classroom. On this basis, it was presumed that the classroom behavior of teachers is "shaped" by the different stimulus events that occur in the classroom and that these stimuli act as reinforcers. Hence, exposition of education methods or principles could be expected to help the student teacher talk about teaching, but only classroom experience could train the beginning teacher to teach. It was concluded that a technique, which would permit a supervising teacher to control the stimulus events in the classroom, via simulated experiences, could effectively shape the behavior of the student teacher in training by reinforcing successive approximations of the desired behavior.

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[1]Presented at the American Educational Research Association, Chicago, February, 1966, as part of the symposium, "Laboratory Simulation: New Developments in Instruction and Research."

[2]A more detailed description of the materials and technique appears in the appendix.

Using this theoretical model, a single sixth grade classroom, "Mr. Land's Sixth Grade," was simulated, and a continuous program of research on different instructional variables has been undertaken. This research has stimulated further improvement in the instructional materials.

From this original theoretical basis, Kersh developed the concept of "controlled feedback," i.e., feedback which is controlled by the experimenter. Originally, the feedback was to be manipulated as "reinforcing stimuli." However, as developed, the feedback may or may not be reinforcing. The student teacher is presented with short sequences on film showing the most likely response of the simulated class to the teacher's behavior. The feedback, although "controlled", now is considered simply as information in the ongoing instructional process. Thus, Kersh shifted the basis for his instructional simulation experience to an "information-system approach," as formulated by Ryans (1963). Ryans treats the teacher as an information-processing system which receives information, evaluates, makes decisions, encodes messages for the students, and transmits the messages using appropriate communication channels.

Why Have Classroom Simulation?

The development of the classroom simulation technique was prompted, in part, by numerous problems involved in the placement of preservice teachers for field experience. These problems are hardly new. Many schools report difficulty in placing student teachers, even for simple observation experiences. However, Kersh looked beyond these problems, and saw the need for a new technique — a type of instruction that could supplement conventional preservice teaching experience.

In educational methods courses, student teachers are given a great deal of advice, often based on valid educational principles, that might aid them in communicating with and controlling the class. It is rare, however, that a student teacher has the opportunity to practice these techniques in a way that is meaningful.

In terms of Ryans' model, student teachers have little opportunity to learn how to discriminate between, and evaluate cues that are the basis for decision-making, from cues that represent problem-free activities. Also, the student teacher has little opportunity to practice responding to these situations, making decisions, and considering the possible consequences of his action. Let's consider these points in more detail.

Cue discrimination. Simulation training enables a student to practice discriminating cues that signal potential problems that require immediate attention. Such training may teach students strategies of searching that may aid him in spotting potential problems in both planned and unplanned classroom activities. Traditional solutions to the problem of providing effective observation experiences often are limited in that the student observer is given little preparation in observational techniques, and consequently has little idea of what he is to observe. Newer approaches to the problem of providing effective observation experiences (video tapes, kinescope recordings, or motion-picture demonstration sequences) are effective in presenting classroom situations without interfering with ongoing instruction. However, they do not teach students how to observe, what to look for, and why the situation is being observed. Further, passive viewing of demonstration films and video tapes offers students little opportunity to develop perceptual skills in identifying cues from the teacher's standpoint that are characteristic of problematic classroom situations.

Another limitation of conventional observation programs and televised instructional materials is that they often lack information concerning individuals in the classroom or the classroom as a whole. In actual classroom situations, experienced teachers use strategies of watching the class that are determined, in part, by the class and its members. Classroom simulation involves the student teacher in learning important facts about each child in the simulated classroom.

He learns to "know" the child -- what role he plays in the class, his strong points, his weak points, his interests, and how Mr. Land, the supervising teacher, evaluates him.

It is important that the student teacher know each child since experienced teachers make decisions with the use of such information. There can be little doubt that teachers learn to react differently to different classroom groups and individuals.

Decision-making. In simulation training, a student learns how to fill the role of the student teacher in the classroom by participating in a comparable role in the simulated situation. Classroom simulation, as a supplement to supervised experience in the classroom, allows the student to practice decision-making without the fear of censure or embarrassment -- to learn how it feels to be "tested" by the students, to try alternative methods of handling a problematic situation, to experience how students look when they are inattentive or confused, and to learn immediately possible consequences of his actions. Since training is non-punitive, it is easy for the student to be wrong, as well as right, thus creating a desirable learning situation. Simulation allows for what some people have called "constructive failure." The technique enables students to make mistakes without hurting anyone, and to learn from these mistakes.

We have often observed the novice teacher, who is so threatened by observers in her class that she fails miserably at her lesson. Further, the situation is so threatening that she fails to try out new ideas, and to attend to little details that ordinarily are handled adequately. Generally, she makes a mess of things. Simulation training is a powerful technique that short cuts this exasperating experience, and enables the student teacher to learn from subsequent classroom experience in a more optimal way.

Behavior modification. Simulation enables the student to look ahead. It enables him to discover some of the possible consequences of various actions that he makes in the classroom. A most important feature of instructional simulation is that it trains the student to become sensitive to feedback. Thus, the student becomes a reactive mechanism as well as an active mechanism. The information flow is not only from the teacher to the class, but also from the class to the teacher. Thus, instructional simulation provides the vehicle whereby the student teacher may practice processing this feedback information — what some have called "provocative feedback" — from the class. This type of feedback may have the effect of causing a variety of behaviors, each that may be evaluated subsequently on the basis of further feedback. Only by chance in practice teaching would a student gain this type of direct trial-and-error experience.

In brief, instructional simulation forces the student teacher to focus on a situation and devise different modes of responding. Simulation offers the student an opportunity to build his own strategies of searching for cues that signal a decision-making process on his part, to test hypotheses he has about how to respond to these problems, and an opportunity to change his behavior in view of the feedback he receives.

What is the Future of Classroom Simulation?

In the past four years, many instructional variables have been researched, using "Mr. Land's Sixth Grade." For example, two projects (Kersh, 1963b; 1965) have concerned themselves with realism variables: (a) size of image (small or large) in the orientation-pretest experience, and training; (b) mode of feedback (visual or verbal); (c) mode of response (enacted or verbalized); and (d) motion in image (moving or still). More recently, prompting has been studied as an instructional variable (Twelker, 1966). An ongoing research project is investi-

gating the simultaneous, as contrasted with the successive, attainment of objectives, and the interaction between these modes of presentation and learners' cognitive and personality characteristics. Findings have suggested that realism in simulation, and prompting, are not important variables in enhancing transfer, in comparison with instructor differences, and, possibly length of training.

The evidence that realism is not a crucial factor in transfer is not surprising. Research on the importance of realism in the reproduction of the stimulus input, and the realism of the required response in psychomotor tasks, has shown no relationship between stimulus or response precision and transfer of training (Adams, 1962).

At present, a curriculum development effort is underway at Teaching Research Division to produce low-cost simulation packages, both to train teachers in using the "discovery method," as well as in handling problems of management and control. These packages will be so designed to allow their use in a wide variety of circumstances. They may be adapted for self-instructional use, for group use, or for the tutorial method as now used. It is hoped that most of these materials will be ready for use in experimentation by the end of 1966. While the previous research on simulation has answered some questions, it has raised even more, particularly as they pertain to the interaction of students' individual differences and modes of simulation training. Many questions remain to be answered. For example, how does length of training interact with mode of presentation (group, tutorial, or individual self-paced), and amount of guidance given, in terms of educational principles? How does the pretraining level of student teachers interact with variables such as mode of presentation? What is the best way to use the new low-cost materials?

With the availability of the new materials, we may for the first time, be able to compare auto-instructional modes of simulation training with the tutorial or group modes. Further, it will enable us to evaluate these materials throughout the country. The original materials were limited in that they required expensive laboratory facilities and equipment.

We are often asked the question, "How does simulation training affect actual classroom performance?" Despite difficulties involved in gathering such data, initial evidence does indicate that there is transfer of learning from the simulated to the real experience (Vlcek, 1965; Kersh 1965). Vlcek's observational data show that students who have had training learn instructional principles that subsequently are used in practice teaching. In Kersh's most recent study, a supervising teacher's questionnaire asked, among other questions, "How long did it take for the student teacher before he was ready to assume full responsibility for the class?" As reported by Kersh (1965), those students who had undergone simulation training were ready to assume full responsibility three weeks earlier than a comparable group of students which did not have training.

In summary, we have produced evidence that simulation training works. After four years of research on the technique, we have some notions about why it works. Yet, in terms of answering the question, "How best does it work?", our research has just begun. We trust that in the next few years, this question will be answered.

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Appendix

Classroom Simulation

Description of the Technique

The classroom simulation technique under consideration attempts to create for the student teacher all of the relevant features of a single classroom situation. Potentially, many different classrooms may be created, but presently the technique is limited to one group of sixth graders named, "Mr. Land's Sixth Grade." Mr. Land is the hypothetical supervising teacher with whom the student teachers work during his simulated experience. A complete cumulative record file is available on each child, including standardized test data, achievement records, health records, a summary of the teacher's anecdotal records, and a snapshot. In addition, there are printed descriptions of the hypothetical school, "College Grove Elementary," and the community of "College Grove." The student teacher may be further oriented to Mr. Land's Sixth Grade through the use of motion picture sequences presenting the class under the direction of Mr. Land as they might appear during an observation session.

A technique of filming the youngsters in Mr. Land's Sixth Grade, so that they appear to be reacting directly to the student teacher who is viewing the sequences, is employed in 60 different problem sequences on film, all involving the same group of youngsters. The 60 problem sequences are divided into three sets of twenty sequences each called Program I, II, and III. Each of the three programs correspond to one school day and are roughly parallel in terms of the types of problems included. The selection of problems was based on the work of Hughes (1959). One half of the filmed sequences pose problems in classroom management for the student teacher, and the remaining are classed as communication problems (inattention, interjection of new information by a student, etc.). In each case, the student teacher is expected to react to the film as if he were in a live classroom.

To further enhance the simulated practicum from the instructional standpoint, feedback sequences are available for each of the 60 problem sequences. The feedback sequences show the student teacher how the youngsters might react to his handling of each of the problematic situations. Presently, there are at least two alternative feedback sequences available for each of the 60 problem sequences. By using three remotely controlled projectors simultaneously, the motion picture projection of the children may be changed from the problem sequence to the feedback sequence instantly.

The proposed technique is not intended to be rigid in its approach. As is true in the "real world," the learner does not learn precisely how to react to each classroom situation. Instead, the objective is to develop a learning set towards a specific class of teaching problems — a way of operating within certain behavioral boundaries.

Instructional Procedure

In brief, the instructional procedure which has been developed for experimentation with the simulation materials is as follows. First the student teacher (T) is oriented to the simulation facility and to the procedure. Then he is given a performance test in the simulated classroom using one of the three programs. The orientation and pretesting procedure takes approximately one and one-half hours per subject.

Next, T is given the actual instruction in the simulation facility with the projections adjusted to the particular degree of realism desired. The filmed problem sequences of actual classroom situations are presented and T is requested to enact his response to each. Depending upon the reaction of T, the experimenter (E) selects and projects one of two or three alternative feedback sequences.

A variety of problem sequences are employed to teach a specific principle or skill. Each sequence is repeated until T achieves the pre-established level of performance. After each presentation of the problem and feedback sequence, E and T discuss the experience together in preparation for the next experience. E usually withholds direct guidance as much as possible, forcing T to rely heavily on the feedback sequences and supporting records in his self-evaluation.

After the instructional phase, T's performance is tested in the simulation facility. Twenty new filmed problem sequences, different from the instructional sequence, constitute a test of transfer.

The technique has been demonstrated to be effective and feasible. In fact, it is presently in active use at two institutions in Oregon. Also, variations of the technique described above are under development at several institutions over the country.

Simulation Facility

The research facility, called the "Classroom Simulation Facility," was developed and installed in the Teaching Research Laboratory on the Oregon College of Education campus. More recently, a duplicate facility has been installed in the School of Education at the University of Oregon. Briefly, T stands in a position relatively close to a large central projection screen and is observed by the instructor from the side. The large screen allows a life-size visual image to be projected. Appropriate stage props are used to further enhance the illusion of reality. The instructor controls three motion picture projectors remotely, starting and stopping the projector and switching from one or another as required. An automatic control system keeps the problem and feedback sequences in the proper arrangement.